

SUPPLEMENTAL MATERIAL

Table S1. Individual participant data requested.

- anonymous patient code	- central systolic blood pressure [mmHg]
- date of examination	- central diastolic blood pressure [mmHg]
- group [controls/CD/UC]	- central mean blood pressure [mmHg]
- date of birth or age [years]	- active disease [yes/no]
- sex [male/female]	- any score of activity used
- height [m]	- anti-tumor necrosis factor therapy [yes/no]
- weight [kg]	- salicylates therapy [yes/no]
- Smoking [yes/no]	- disease duration [years]
- Total cholesterol [mg/dl]	- any marker of inflammation available (C-reactive protein, erythrocyte sedimentation rate, white blood cells, neutrophils, lymphocytes, monocytes)
- HDL cholesterol [mg/dl]	
- LDL cholesterol [mg/dl]	- carotid-femoral PWV [m/s]
- triglycerides [mg/dl]	- augmentation index
- brachial systolic blood pressure [mmHg]	- hypertension [yes/no]
- brachial diastolic blood pressure [mmHg]	- hyperlipidaemia [yes/no]
- heart rate [b/min]	- diabetes [yes/no]

Abbreviations: CD, Crohn's disease; UC, ulcerative colitis

Table S2. Quality assessment (risk of bias).

Selection of patients	Was the selection of patients conducted in such a way to avoid bias?	Yes: patients with inflammatory bowel disease and control subjects were matched for known cardiovascular risk factors No: patients with inflammatory bowel disease and control subjects were matched for known cardiovascular risk factors Unclear: no information about the manner in which patients were recruited is given
Study sample-size	Has the study sample-size been explained in detail?	Yes: a sample-size calculation is available No: a sample-size calculation is unavailable
Pulse wave velocity measurement	Has the device and method used to measure carotid-femoral pulse wave velocity been reported in detail?	Yes: the device and method used is available No: the device and method used is unavailable
Cardiovascular risk factors	Have patients with known cardiovascular risk factors been identified or excluded from the study?	Yes: data of all pre-specified cardiovascular risk factors (smoking, dyslipidemia, hypertension, obesity, smoking) are available No: data of all pre-specified cardiovascular risk factors (smoking, dyslipidemia, hypertension, obesity, smoking) are unavailable

Score: Yes=1; No/Unclear=0. All the study included in this individual participant data meta-analysis reach a score ≥ 3 .

Table S3. Studies reporting aortic pulse wave velocity in subjects with inflammatory bowel disease sorted by year of publication.

Authors (year of publication)	Body mass index, Kg/m ²		Systolic/diastolic blood pressure, mm Hg		Age, years			Aortic pulse wave velocity, m/s				
	IBD	Controls	IBD	Controls	IBD			Controls	IBD			
					CD	UC	All		CD	UC	All	Controls
Studies included in the individual participant data meta-analysis												
Zanolí L. (2014) [1]	24.2±4.8	24.7±4.3	118±12/70±11	115±12/70±9	36±14	38±14	37±14	38±13	8.0±1.6	7.8±1.7	7.9±1.7	7.0±1.1
Theocharidou E. (2014) [2]	23.7 (16.5-37.4)	24.3 (18.0-36.3)	115±14/71±12	117±16/72±11	38±10	32±11	36±10	37±11	7.0±1.2	6.3±1.2	6.8±1.2	6.4±0.9
Ozturk K. (2015) [3]	23.7±3.7	23.6±2.8	119±15/72±8	117±12/70±8	30±9	33±8	32±9	31±7	8.2±1.7	8.1±1.6	8.1±1.6	6.9±1.0
Cappello M. (2016) [4]	22.3±3.6	24.0±4.4	118±19/75±14	118±13/76±11	32±7	31±10	32±8	30±6	8.6±1.3	9.1±1.4	8.7±1.3	8.0±1.2
Studies excluded to the individual participant data meta-analysis												
Zanolí L. (2012) [5]	23.5±3.6	24.3±2.8	115±10/66±10	113±11/68±8	29±9	31±8	30±9	31±7	6.5±1.5	6.8±1.3	6.6±1.4	6.0±0.8
Theocharidou E. (2013) [6]	23.7 (16.5-37.2)	24.3 (18.3-34.2)	86 (62-107)	86 (41-113)	38±10	35±12	38 (18-60)	38 (22-60)	6.8±1.3	6.3±1.1	6.6±1.3	6.1±0.9
Akdogan RA (2013) [7]	27.0±4.4	27.5±4.1	n.a.	n.a.	n.a.	48±15	48±15	45±8	n.a.	8.9±3.0	8.9±3.0	7.2±1.7
Korkmaz H. (2014) [8] [*]	26.6±2.6	26.8±3.1	105±9/74±8	104±10/72±9	n.a.	n.a.	43±13	45±11	n.a.	n.a.	6.4±1.3	6.0±1.3
Korkmaz H. (2014) [8] [†]	25.3±3.5	26.8±3.1	107±6/75±7	104±10/72±9	n.a.	n.a.	45±10	45±11	n.a.	n.a.	6.6±1.0	6.0±1.3
Alkan E. (2014) [9]	23.7±1.9	23.7±1.6	118±10/74±8	117±10/71±7	n.a.	n.a.	38±7	38±6	7.2±0.7	7.1±0.8	7.2±0.9	6.0±0.5
Nemes A (2014) [10]	27.4±4.1	26.4±5.2	124±18	123±9	n.a.	39±12	39±12	39±11	n.a.	9.2±1.6	9.2±1.6	7.7±1.4
Aytaç E (2015) [11]	24.0	25.4±1.9	121/75	108±10/59±7	39±10	45±12	n.a.	42±7	9.6±1.4	9.3±1.3	n.a.	7.6±0.3

Data are presented as percentages (%), counts, mean ± standard deviation or median (range). n.a., not available; CD, Crohn's disease; UC, ulcerative colitis; IBD, inflammatory bowel disease. ^{*}in remission; [†]active disease.

Table S4. Algorithms and devices used to measure aortic pulse wave velocity.

Authors (ranked by year of publication)	Year of publication	Subjects, n			Algorithm	Pathway measurement	Device
		CD	UC	Controls			
Zanolí L [1]	2014	34	40	80	Intersecting tangent	Direct x 0.8	SphygmoCor system
Theocharidou E. [2]	2014	29	15	44	Intersecting tangent	Direct x 0.8	SphygmoCor system
Ozturk K. [3]	2015	52	74	66		Direct	Arteriograph
Cappello M. [4]	2016	44	22	37	Max upstroke	Direct	SphygmoCor system
Subjects included in IPD meta-analysis, n		159	151	227			
Zanolí L. et al. [5]	2012	16	16	32	Intersecting tangent	Subtracted	SphygmoCor system
Theocharidou E [6]	2013	43	23	44	Intersecting tangent	Direct	SphygmoCor system
Akdogan RA [7]	2013	0	37	30	Intersecting tangent	Subtracted	SphygmoCor system
Korkmaz H. et al. [8]	2014	18	84	74		Direct	Mobil-O-Graph
Alkan E. et al. [9]	2014	17	23	40	Intersecting tangent	Subtracted	SphygmoCor system
Nemes A [10]	2014	0	11	22		Direct	Arteriograph
Aytaç E [11]	2015	25	30	25	Max upstroke	Direct	Complior
Subjects excluded to IPD meta-analysis, n		119	224	267			

CD, Crohn's disease; IBD, inflammatory bowel disease; PWV, pulse wave velocity; UC, ulcerative colitis.

Table S5. Participant characteristics.

	Controls n=227	Ulcerative colitis n=151	Crohn's disease n=159	P-value
Age, median (range), years	32 (17-67)	32 (16-69)	33 (18-61)	0.54
Age, mean (SD), years	35 (11)	34 (11)	33 (10)	0.54
Male sex, No. (%)	124 (54.6)	97 (64.2)	92 (57.9)	0.18
BMI, median (range), Kg/m ²	24.2 (17.3-40.0)	23.7 (15.1-42.2)	23.0 (13.9-43.3)	0.01
Cholesterol				
Total*, mean (SD), mmol/L	4.7 (0.9)	4.4 (0.9)	4.1 (0.9)	<0.001
HDL†, mean (SD), mmol/L	1.3 (0.4)	1.3 (0.4)	1.2 (0.3)	0.03
LDL†, mean (SD), mmol/L	2.9 (0.9)	2.6 (0.9)	2.4 (0.8)	<0.001
Triglycerides†, median (range), mmol/L	1.0 (0.4-5.8)	1.1 (0.4-3.0)	1.1 (0.4-2.4)	0.15
Cardiovascular risk factors, No. (%)	118 (52.0)	81 (53.6)	95 (59.7)	0.30
Dyslipidemia, No. (%)	90 (39.6)	57 (37.7)	70 (44.0)	0.51
Hypertension, No. (%)	14 (6.2)	20 (13.2)	21 (13.2)	0.03
Obesity, No. (%)	17 (7.5)	11 (7.3)	7 (4.4)	0.43
Age‡, No. (%)	10 (4.4)	4 (2.6)	4 (2.5)	0.51
Current smoking, No. (%)	43 (18.9)	18 (11.9)	48 (30.2)	<0.001
SBP, mean (SD), mmHg	117 (13)	120 (12)	117 (17)	0.09
DBP, mean (SD), mmHg	71 (10)	73 (11)	71 (11)	0.31
PP, mean (SD), mmHg	45 (10)	47 (10)	46 (14)	0.43
MBP, mean (SD), mmHg	86 (11)	88 (10)	87 (11)	0.08
Heart rate, median (range), b/min§	69 (45-105)	74 (47-157)	72 (47-159)	<0.001
Heart rate, mean (SD), b/min§	70 (12)	75 (13)	73 (13)	<0.001
aPWV, median (range), m/s	6.5 (3.3-10.6)	7.0 (4.1-14.2)	7.2 (4.6-11.6)	<0.001
aPWV, mean (SD), m/s	6.4 (1.3)	7.6 (2.2)	7.5 (2.0)	<0.001
aPWV, mean (SD), z-score log _e (m/s)	0.00 (1.00)	0.81 (1.25)	0.79 (1.21)	<0.001
AIx, mean (SD), %	14.0 (15.3)	12.7 (14.0)	13.3 (14.0)	0.72
Active disease, No. (%)	---	49 (32.5)	46 (28.9)	0.50
Disease duration, median (range), years	---	3 (0-28)	5 (0-26)	0.17
Disease duration, mean (SD), years	---	5 (5)	6 (5)	0.17
White blood cells, median (range), billion cells/L§	5.9 (3.5-13.0)	6.8 (3.1-14.2)	6.8 (3.2-17.7)	0.89
White blood cells, mean (SD), billion cells/L §	6.2 (1.5)	7.4 (2.4)	7.3 (2.9)	0.89
C-reactive protein, median (range), nmol/L	30 (3-189)	29 (0-882)	30 (0-1524)	0.01
C-reactive protein, log _e (nmol/L)	86 (76)	95 (143)	95 (171)	0.69
ESR, median (range), mm/h#	9 (1-58)	14 (1-111)	13 (1-117)	<0.001
ESR mean (SD), log _e (mm/h) #	2.15 (0.79)	2.63 (1.03)	2.48 (1.08)	0.004
Therapy				
Anti-tumor necrosis factor and salicylates, No. (%)	---	11 (7.3)	14 (8.8)	0.62
Anti-tumor necrosis factor only, No. (%)	---	7 (4.6)	33 (20.8)	<0.001
Salicylates only, No. (%)	---	104 (68.9)	58 (36.5)	<0.001
Other, No. (%)	---	29 (19.2)	54 (34.0)	0.003

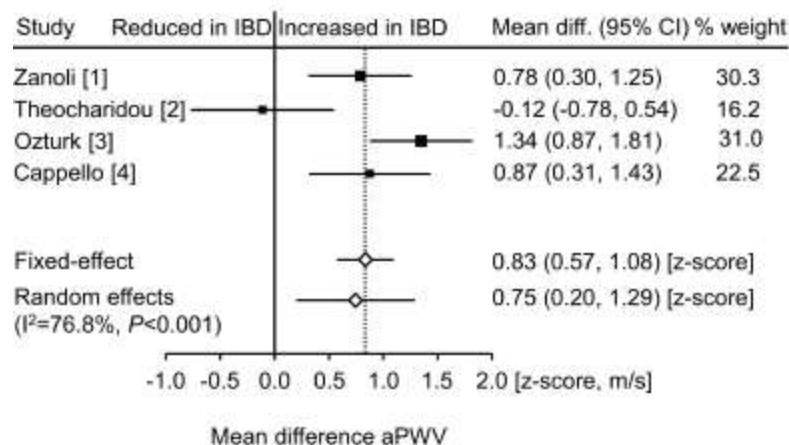
*available in 482 participants; †available in 383 participants; ‡men ≥55 years, women ≥65 years;

§available in 449 participants; ||available in 349 participants; #available in 336 participants.

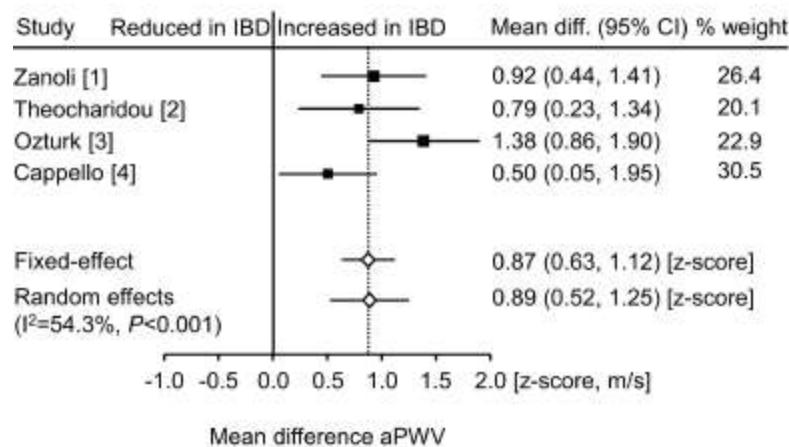
Abbreviations: AIx, augmentation index; aPWV, aortic pulse wave velocity; DBP, diastolic blood pressure; ESR, erythrocyte sedimentation rate; MBP, mean blood pressure; No., number; PP, pulse pressure; SBP, systolic blood pressure; SD, standard deviation.

Figure S1. Forest Plot for aortic pulse wave velocity (aPWV) in 227 Controls and 151 patients with ulcerative colitis (**A**) and in 227 Controls and 159 patients with Crohn's disease (**B**) included in this individual participant data meta-analysis. Works are sorted by year of publication.

A



B



Supplemental References:

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9. Alkan E, Karakaş MS, Yıldırım B. Evaluation of increased subclinical atherosclerosis risk with carotid intima-media thickness and pulse wave velocity in inflammatory bowel disease. *Turk J Gastroenterol*. 2014;25 Suppl 1:S20-S25.
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